Chapter 9 EMERGENCY LANDINGS AND SURVIVAL

A. OFFSHORE OPERATIONS:

1. Auxiliary flight rules authorize operations to 25 miles from shore for single engine aircraft, therefore, it is an accepted risk that our search altitudes will result in Auxiliary aircraft operating beyond gliding distance from land.

2. It is mandated that landing, egress and survival briefings must be a part of each flight.

B. BEACH LANDINGS

1. Beach landings should only be attempted as an emergency measure. The fact that the aircraft can make it to the beach in itself may not prevent consideration of a water ditching. The beach may be crowded with bathers and adequate landing space may not be available.

2. Select an area that is clear of debris and land on the area of sand nearest the water to take advantage of the firmness of the wet sand. Use a soft field landing technique. Touch down lightly at minimum airspeed but avoid a stall. Keep the yoke back on touch down whether in tricycle or conventional gear aircraft. Keep in mind the fact that if one wheel is on the hard pack and the other is in the surf (or on the soft sand), control will be lost and the aircraft may flip. When landing with a retractable gear aircraft it may be advisable to keep the gear up.

C. DITCHING

1. If it becomes necessary to ditch in the water, the following actions should be taken:

   a. Broadcast distress information on appropriate frequencies.

   b. Secure or jettison loose gear, which could be hazardous on impact.

   c. The inflatable raft must be readily accessible and, if possible, held securely by a crewmember.

   d. Wedge the canopy or door(s) in the open position to prevent jamming upon impact.

   e. Do not extend the landing gear.

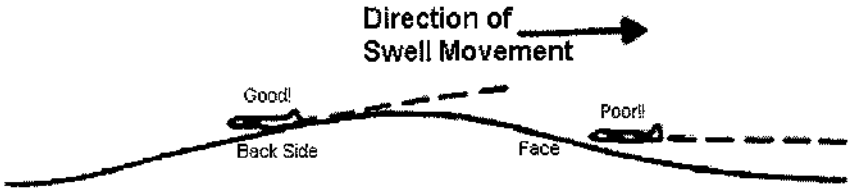
   f. Execute ditching maneuver.

2. If seas are less than one foot, no white caps, approach into the wind, flaps fully extended. Make a full stall landing with slight power, if available. In a low wing aircraft, the flaps should be up so that they do not catch on a wave.

3. If the seas are greater than one foot, approach cross-swell (parallel to the wave crests of the major swell) with flaps fully extended. Approach to take advantage of any head wind component while avoiding landing directly into the face of a swell. As the size of swells increases, the landing heading must increasingly parallel the swell, accepting cross wind components. (Fig. 9.1).

Fig. 9.1 Ditching

Landing Parallel to the Major Swell



Landing on the Face and Back

4. Exiting the Ditched Aircraft: With all aircraft, there is a possibility that the aircraft will invert when it comes to rest in the water. During impact, crewmembers may become disoriented and not realize that the aircraft has inverted. All crewmembers should be instructed to assume that the aircraft is in an inverted position, and, when releasing the harness, be prepared to fall head-down. As soon as practical exit the aircraft bringing the raft and survival gear with you. All of your personal survival gear should be stowed in your inflatable vest so that it comes out of the aircraft with you.

5. Plan your egress route in advance. One theme that runs through all Coast Guard mishaps involving successful underwater egress is that survivors had an escape plan before the accident occurred. No matter where your crew position is located, you should always know where you're going to go in an emergency, how you are going to get there, and what is likely to get in your way.

6. Maintain your orientation within the aircraft. This is certainly the most important action you can take. Next to panic, disorientation is your biggest problem in

accomplishing a successful egress. You should always remember that as long as you remain strapped securely in your seat, your orientation is familiar to you although the aircraft is upside down in the water. What is normally on your right is still on your right, and what is normally on your left is still on your left. Exit the aircraft promptly with your survival gear.

7. Account for all personnel. The aircraft can be expected to float for as little as 45 seconds. Move away from the aircraft.

8. Keep calm, remember that a person will usually float, not high out of the water perhaps, but he/she will not sink. He or she will float even higher in the relatively dense salt water of the sea than in a fresh water pool. At first, just paddle slowly with your arms and tread with your legs until you get oriented. Pull the lanyard and inflate the life vest. When wearing an inflated life vest, it is easier to swim on your back. If you are also wearing an exposure suit, its natural buoyancy will help keep you afloat until you inflate the vest. Your first thought should be to find your raft and get aboard. Do not remove your shoes or your clothing. Take it easy. Restrict your swimming to reaching your raft. If you have taken the precaution to fasten your raft to your life vest by a lanyard before exiting the aircraft, you will not lose it to a stiff breeze.

D. SURVIVAL AT SEA

1. Life preservers: Pneumatic life preservers are safe, comfortable, and easy to wear and do not require inflation for fitting and adjusting. They are designed to provide sufficient buoyancy to support downed airmen after they bail out or ditch into the water. These preservers are of the rapid inflation style with an auxiliary oral inflation device. Accessory survival items may or may not be attached, depending upon the type of preserver. If not attached, survival items should be carried in the pockets of the flight coveralls. All survival equipment should be attached to you or the raft with a lanyard.

    a. It is imperative that all crewmembers be familiar with the donning, fitting, care, and operation of the preserver that is used in the aircraft. Once aboard a raft, the preserver should be kept inflated in case the raft capsizes or is deflated.

2. Life raft: A carbon dioxide cylinder inflates the raft when the lanyard is pulled. There is a valve for oral inflation that closes automatically by spring pressure when it is not held open. Handles or straps are provided as aids for boarding the raft.

    a. The best way to board a life raft is to grasp the boarding strap, kick your feet vigorously while pulling your elbows and life preserver over the raft tube, then grasp the boarding strap on the other side and roll your body into the raft. For the one-man raft, it is better to board over the small end than the side to lessen the possibility of the raft capsizing. Thrust your body over the small end of the

raft face down, and then roll over to a face up position. Extreme care should be taken by personnel boarding the raft to ensure that no sharp objects puncture the fabric of the life raft. A sea anchor is attached to the raft by a line. Deploy the sea anchor to stabilize the raft and to minimize your drift from the location of the ditching.

b. The life raft normally available to Auxiliary aircrews will usually contain little survival equipment and no water or rations. During the annual training sessions, the raft should be inflated and the crews should become aware of what equipment is included and how to use it. It is essential that all of the signaling and survival equipment be attached to either you or the raft. Nothing would be so disheartening as to see your signaling mirror slipping away into the depths of the ocean. Be constantly alert to the danger of puncturing the raft with sharp objects. Do not dangle your hands or feet into the water as this invites unwanted predators such as sharks.

c. If multiple rafts are used, they should be tied together. This creates a larger target that is more likely to be spotted by searching units.

3. Signaling: Signaling devices that are either carried on your person or in the life raft may be the only equipment that can be used to effect a quick rescue. Know how to use them.

4. Emergency Position Indicating Radio Beacon: EPIRB's transmit a continuous signal on the distress frequencies of 121.5 MHz and/or 243.0 MHz. The SAR satellites receive this signal and relay it to ground stations. The location of the distress, as determined by the satellite, is passed to the appropriate rescue coordination center, which deploys suitable rescue forces. After you are settled in the raft, make sure your EPIRB or other rescue radio (such as a PRC-90) is turned on and remains on until rescue units arrive.

5. Signaling Mirror: Next to the EPIRB, your signaling mirror is the most valuable signaling device you have. Since it does not rely on batteries or pyrotechnics, it is also the most reliable. The military issue mirror has a grid in the center of the rear face. Look through the hole in the center of the rear of the mirror and sight the object on which you would like to direct the sun "flash." Swivel the mirror until you see the grid around the hole light up. This will indicate that the "flash" or solar reflection is directed toward the target. Use your signaling mirror to continually sweep the horizon. A flash from a signaling mirror can be seen more than 5 miles. When you are SURE that the rescue unit has you in sight, quit flashing the mirror as its beam is so strong that it will hamper the pilot's ability to fly the aircraft or the coxswain to operate the vessel. Practice using your mirror so if the need should arise you will be proficient.

6. Pyrotechnics: The red flares are for night use and the orange smoke for day. These should not be expended unless search units are within sight and are in a position to be reasonably expected to see them. It would be a wasted resource if ignited when

the search unit is moving away from your position. When igniting pyrotechnics, hold them outboard over the downwind side of the raft and pointed downwind so any hot drippings will not damage your raft. When using a pen-gun, it is imperative that the gun be cocked before the flare is screwed onto the end. This retracts the firing pin. If you fail to do this, the flare may ignite as you are screwing it on. The launcher should be pointed overboard and away from any person as it is being loaded. When firing aerial flares aim them downwind with about a 45 to 60 degree elevation. This precludes the possibility of the meteor falling back into the raft or onto you if you are floating in your life vest. Do not fire aerial flares directly at an incoming rescue aircraft. During daytime, fire the flare (orange) perpendicular to the flight path of the rescue aircraft. Many rescue pilots report the smoke trail from the flare is more visible than the flare itself during daylight conditions.

7. Dye Marker: Dye markers creates a large florescent green cloud in the water around you or your raft and greatly enhances sightings from aircraft. The use of a dye marker must be planned as it takes approximately three minutes for the dye to fully spread and its effect lasts only 15 to 20 minutes depending on sea conditions. Open the packet then move it back and forth under water next to your raft to disperse the dye.

8. Pocket Strobe: The pocket strobe should be used only at night and when aircraft or vessels are seen or heard as the batteries on the pocket strobe have a limited effective life, typically about 10 hours. For best visibility the strobe should be as high as possible. Military aviators have a velcro patch on their helmet to hold the strobe light high on the body.

9. Whistle: Over the water, the sound of a whistle can be heard for a much greater distance than your voice. Using the whistle requires less effort and can be sustained for a longer period.

10. Space Blanket: The orange side of your space blanket should be spread to enhance your visibility when search units are seen or heard.

11. Exposure: Exposure to sun, wind, and salt water is relatively easy to prevent. Even in the tropics save all your clothing. Wear clothing most of the time. Do not shed clothing unless you have a cover to protect you from the rays of the sun.

12. Hypothermia: The rules pertaining to the wearing of Personal Flotation Devices (PFD), the carrying of life rafts and the wearing of exposure suits, are found in Chapter 4 of reference (b). Recognize the dangers of hypothermia. In cold weather, huddle together under the raft cover, wearing dry clothing if possible. Use your space blanket to retain your body heat and to break the cooling effect of the wind. Try to keep the raft dry. Even if you are unable to be in a raft, it is generally a poor idea to attempt to swim. The loss of body heat during swimming is considerably greater than when you remain in the huddle position floating in

your PFD. Keep all of your clothing on including your flight boots. Your clothing helps to contain your body heat. Try to keep your head out of the water, as it is one of the areas of your body through which considerable heat can be lost. Wear a hat.

13. Shark defense: Shark attacks are rare but there are certain things that you can do to minimize the probability of attracting sharks and to defend yourself should they appear. The best situation is to be in a raft. Keep all hands and feet inside the raft. If you are floating in a life vest, make slow even movements. Jerky irregular movements attract sharks. If you fly over waters frequented by sharks, include a very large plastic garbage bag in your survival kit. If you are not in a raft, open the bag and float inside (this can also help to keep you warm). Scoop water into the bag so that it fills to its expanded shape. A small-inflated ring such as a large bicycle inner tube is ideal to hold the upper rim of the bag. What this accomplishes is to retain your body fluids, which attract sharks, and presents a large object with no projections to the shark. If sharks do appear, attempt to continually face the nearest shark. If the shark attempts an attack, yell or blow your whistle. Wearing your gloves or with your hand wrapped strike the shark soundly on its snout from the top. Uppercuts are not recommended, as this is where the cutting edge is located. Sharks close their eyes as they attack, so as the shark attacks attempt to move to one side.

14. Psychology: A person's worst enemy can be his own mind. You must avoid any tendency to give up even in the face of seemingly overwhelming odds against survival. The shock created by an actual casualty, the immersion in cold and often rough water, and the realization that you are facing a true life-or-death situation increases psychological stress and impairs judgement. Unless you gather not only your resources but also your wits and maintain a positive attitude no matter how desperate the situation may seem, your chances of survival will be substantially decreased. The chances of survival of the others with you will be affected by your attitude. You must keep in mind that a maximum effort is being made to rescue you but you must do your part by remaining rational and being ready to signal when the time is right.

15. Recovery by helicopter: If you are in a raft, it will be necessary to abandon the raft and move away from it. Attempt to fill the raft with water and partially deflate it. Coast Guard helicopter pilots are trained to avoid floating objects, such as life rafts, due to the possibility of blowing the object into the rotor disk. As the helicopter approaches, down wash from the rotor will cause a wall of spray to be generated. Turn you face away from the aircraft until it is overhead. There is a relatively calm area directly under the aircraft. When the basket is lowered, do not touch it until it contacts the water. There is considerable static electricity generated by the helicopter and touching the down bound basket could subject you to a debilitating electrical shock.

a. After boarding the basket, signal when you are ready for hoisting with a "thumbs up." Keep your hands and feet inside during hoisting. When you are level with the aircraft wait until the basket is brought aboard before attempting to exit the basket. A sudden movement by you in attempting to assist the hoisting crew could throw everyone off balance and jeopardize the whole evolution.

E. SURVIVAL ON LAND

1. In the case of a forced landing ashore, evacuate the aircraft immediately carrying all of the signaling equipment with you. Stay away from the aircraft until the engines have cooled and spilled gas has evaporated. Check injuries, give first aid, and make any injured comfortable. Be careful in removing anyone from a crashed aircraft, they may have incurred back injuries or fractures. Prepare signals that can be recognized from the air (see illustrations in Chapter 4). Check to insure that your aircraft's ELT has been activated. If it was not activated by the crash landing, it may be possible to activate it manually. Marshal all your resources, including the signaling devices that could be set off when you know that help is near. Keep calm and prepare to wait for help to arrive. It is usually best to stay at the crash site as the crashed aircraft is usually easier to locate than persons on foot. If circumstances are such that you must move away from the crash site, be sure to leave a note with the date and time, and explain your intended route and destination.

2. Loss of body heat, hypothermia, can be minimized by the use of layered clothing. After the potential for a post crash fire has passed, the fuselage of the aircraft can be used for protection from the elements. Your "space blanket" can be used as a windbreak, as a lean-to or wrapped around you to contain your body heat. It is important to remain as dry as practicable. Wet clothing accelerates heat loss. Use the matches from your waterproof match case to start a fire. Shredding small branches from dead trees or bushes can create dry kindling. Although the outside of the branch may be wet from rain or other precipitation, the interior is usually dry. The fire also provides a signal for search units. Keep a supply of green branches handy. If search units are heard in the area, these can be put on the fire to increase the smoke output. Be careful not to smother the fire in the process.

F. SURVIVAL TRAINING

1. All Auxiliary pilots, air crew and observers are required to, at least annually, attend an aviation operations training seminar and participate in emergency egress and water survival training. It is also recommended that Auxiliary aircrews be encouraged to obtain first aid and CPR training.

2. Emergency egress and water survival training should be developed on a local level to match the conditions peculiar to the aircraft being flown and to the expected

operating environment. Aircrew members should be thoroughly familiar with the equipment they possess for survival. Since the CO-2 cartridges should be replaced periodically to insure that they would work when needed, it is not a great expense to actually inflate them for training. Diving into a swimming pool with vest deflated and then inflating the vest after coming to the surface can be done as part of a survival training exercise.

3. All Coast Guard air stations hold wet drills and survival training which are available to Auxiliary aircrews by prior arrangement. This is only one example of the training assistance that can be provided to the Auxiliary by Coast Guard air stations.

4. It is the responsibility of the PIC of each Auxiliary aircraft facility to insure that all crew members are trained in the emergency and egress procedures for the particular aircraft being operated. This requirement is in addition to the general annual training and should be a part of each pre-flight brief.